AN

INAUGURAL DISSERTATION

ON THE

PRUNUS VIRGINIANA,

commonly known in the UNITED STATES by the name of

WILD CHERRY-TREE;

SUBMITTED

TO THE

EXAMINATION

OF THE

Rev. JOHN EWING, S. T. P. PROVOST,

THE

TRUSTEES & MEDICAL FACULTY

OF THE

UNIVERSITY OF PENNSYLVANIA,

on the twenty-seventh day of May, 1802,

FOR THE DEGREE OF

DOCTOR OF MEDICINE:

BY CHARLES MORRIS,

OF VIRGINIA.

Honorary member of the PHILADELPHIA MEDICAL SOCIETY.

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TO

JAMES D. M'CAW, M. D.

of Richmond,

VIRGINIA,

THIS

DISSERTATION

IS RESPECTFULLY INSCRIBED,

as a small, though sincere mark of

GRATITUDE AND ESTEEM,

BY HIS OBLIGED FRIEND,

AND FORMER PUPIL,

THE AUTHOR.

TO

BENJAMIN SMITH BARTON, M. D.

Professor of Materia Medica, Natural History, and Botany, in the University of Pennsylvania,

THIS

ESSAY

IS LIKEWISE INSCRIBED,

as a grateful acknowledgement

OF THE

numerous acts of friendship and politeness

CONFERRED UPON

HIS FRIEND,

THE AUTHOR.

INTRODUCTION.

I HAVE selected the Prunus Virginiana of Linnæus, as the subject of this dissertation, not so much from an expectation of producing anything, myself, deserving the attention of the public, as from a hope of directing the inquiries of some more able and experienced experimenter to the investigation of this common vegetable. The Virginian Cherry-tree seems to possess properties, that would justly entitle it to a respectable rank, in the Materia Medica, among the most powerful Tonics; and would make it an useful substitute for the Peruvian Bark.—That every Citizen of the United States is materially interested, on principles of œconomy and general utility, in the discovery of a medicine, from among our indigenous vegetables, which shall supersede the use of the Peruvian bark, must be admitted when we consider: that the price, at which this foreign medicine is vended, has become so exorbitant as, in many instances, to exclude the paupers of our Country from its beneficial effects: that the certain consequence of of a war, which should interrupt our regular supplies, would be not only such an increase in the

price, but such a scarcity of this article, as would put it out of the power of a major part of our countrymen to avail themselves of its use :* that this extravagant price, would entice, the sordid venders of it, to such adulterations, as would render it a medicine of doubtful efficacy, when exhibited to those, who could afford to purchase it.

If we be not so fortunate as to discover, imbosomed in our immense forests, a plant or plants fully equal in medicinal powers, to the celebrated South American vegetable, yet should we find one of but little inferior properties, I will venture to say, that it wil prove equally or more successful in medical practice, because we may obtain it genuine, which is not the case with the Peruvian bark, it being too frequently obtained, in an adulterated state, from our Apothecaries.

* Dr. Rush mentioned, in his last course of Lectures, that during the revolutionary war, Peruvian bark sold for sixteen dollars the pound.

BOTANICAL DESCRIPTION, &c.

§. I.

THE genus PRUNUS, or PRUNE, is arranged by Linnæus in the first order of the twelfth class of his Sexual System; the class and order *Icosandria Monogynia*— In this interesting, and in several respects natural class, the Prunus is associated with many other genera, to which it has strong affinities, which is not necessary to take notice of in this place. In his work on the *Natural Orders** it is thrown into the XXXVIth order, called *Pomaceæ*, along with the following genera, viz: Spiræa, Ribes, Sorbus, Cratægus, Mespilus, Pyrus, Punica, Chrysobalanus, and Amygdalus. The learned M. De Jussieu refers our plant to the Xth order (*Rosaceæ*) of his XIVth class.† In this order, we find many other genera beside those, which Linnæus has referred to his order *Pomaceæ*, and even several which do not belong to the class *Icosandria*.

Many different species of Prunus are known to the botanists. Of these, several (most of

* Prælectiones in Ordines Naturales Plantarum. Edidit P. D Giseke. Hamburgi: 1792.

† Genera Plantarum secundum Ordines Naturales Disposita, &c. Parisiis: 1789

which have, hitherto been imperfectly described) are natives of North America. In the following pages, my attention will be entirely directed to the consideration of one species, the Prunus Virginiana.

The Prunus Virginiana is thus defined by Linnæus: viz.

"PRUNUS floribus racemosis, foliis deciduis "basi antice glandulosis."

Caroli Linnæi *Species Plantarum*, &c. Tom I. p. 677 & 678. n. 2.

"P. flowers racemed, leaves deciduous glan- "ded before at the base."

A System of Vegetables, &c. Vol. I. p. 378. no. 2.

This species of Prune is the

"Cerasus sylvestris, fructu nigricante in racemis longis pendulis Phytolaccæ instar congestis" of Gronovius.

See *Flora Virginica*, &c. p. 54.

"Cerasi similis arbuscula mariana, Padi folio, flore albo parvo racemoso."

See Catesby's *Natural History of Carolina*, &c. Vol. I. p. 28. t. 28.

The "Cerasus latiore folio; fructu racemo- "so purpureo majore," described and figured

by Catesby, who calls it "Pigeon Plumb," appears to be a variety of the same.

Natural History, &c. Vol. ii p.94. t. 94.

It is the "Prunus-Cerasus Virginiana", of Marshall.

Arbustum Americanum, &c. p.112 & 113.

I am inclined to think, that the Prunus serotina (so called from the circumstance of its late flowering) of Professor Willdenow, is no other than the Prunus Virginiana of Linnæus—But, perhaps, this point is somewhat uncertain.

The best figure that is known to me, of our vegetable is that of Catesby, in the work to which I have referred above. Vol. i. t. 28.

This vegetable is best known in the English books of Botany by the names of American Bird-Cherry-tree, and Virginian Bird-Cherry-tree. Its most common name in the United States is the Wild Cherry-tree. It is the *Min-nau-quhq* of the Mahican-Indians; the *A-le* of the Oneidas, and the *A-re* of the Tuscaroras.

The Prunus Virginiana is one of the largest known species of the genus in North America. It is also one of the most common. It inhabits an extensive tract of country, being found at least as far North as the latitude of 44, and as

far South as latitude 29. It is not probable, that these are the utmost limits of its range, towards the North and South. I believe it is found farther North on the West than on the east side of the Alleghaney-Mountains.

The Prunus Virginiana grows naturally in a rich and moist soil. Indeed, the quality of the soil is often estimated by the presence and the size of this tree. Sometimes, however, it is observed to grow in a poor soil. Mr. Catesby says, that it seldom grows larger (in Carolina) than a man's leg; but, he also observes, that by being removed to more open places, it sometimes acquires the size of two feet in diameter. In many parts of the United States, it arrives to the height of forty, fifty, or sixty feet, and to at least two feet in diameter. It is observable, that the trunk generally retains its thickness for a considerable height, and branches out towards the top. The leaves are somewhat lance-shaped, or long, narrow, pointed, and serrated or sawed on the edges.

The flowers are produced in racemes, or bunches, which are long, and set pretty thick upon the branches. They are of a white colour, and composed of five small petals, sitting in a calyx which is five-cleft. They are seldom in bloom, or perfection, before the middle of May, in the

middle parts of the United States, as in Pennsylvania, New-Jersey, &c. By the time this species is in flower, most of the other species of Prunus, as well foreign as domestic, have dropped their petals. The flowers are succeeded by a small fruit, of a purplish colour when ripe, and considerably resembling, particularly in their manner of growth, the berries of the Phytolacca decandra, or Poke. They have a bitterish taste (though there are varieties which are nearly destitute of the bitter taste, and are deemed very agreeable eating), but are the favorite food of different species of birds, particularly the Robin (Turdus Migratorius), the Ferruginous Thrush (Turdus Rufus), and Mocking-Bird (Turdus Polyglottos), &c.

The timber of the Virginian Prune is of a reddish streaked colour, and capable of receiving a fine polish. It is frequently sawed into boards, and is used by joiners, cabinet-makers &c. for many valuable or ornamental purposes.

A fine transparent gum, of a brownish colour, insipid to the taste, and readily soluble in water, exudes from the body and branches of this tree, during the summer heats. May not this gum, in many instances, supply the place of the Gum-Arabic of the Shops ?

The bark of the Cherry-tree consists of three

layers: the outer is thin, smooth, of an epidermidal nature, and dark colour: the middle is thicker, more brittle, and of a pale yellow colour: the innermost is more fibrous, and of a brighter yellow colour.

When dry, like the Peruvian Bark, it is friable between the teeth; does not separate into fibres; and breaks not shivery, but short, close and smooth.

Its taste is considerably bitter, astringent, very durable in the mouth, and accompanied with some aromatic warmth.

There is a great similarity between the flavour of this bark, and the skin inclosing the kernels of peach-stones. Indeed, they taste so much alike as to induce me to think they possess some virtue in common.

§. II.

With a view to ascertain the properties of the bark, taken from different parts of the tree, I instituted the following experiments:

Experiment 1.

By boiling one quart of soft water to a pint, upon two ounces of the recent bark, taken from a branch an inch and a half in diameter, I got a

very bitter decoction, with a perceptible astringency to the taste.*

Upon adding a tea-spoonful of a solution of Sulphate of Iron to two ounces, by measure, of this decoction, a greenish black colour was immediately produced.†

Experiment II.

Soft water one quart boiled to one half, with two ounces of the recent bark, taken from small branches one fourth of an inch in diameter, afforded a decoction very similar to that of the first experiment; only differing from it in point of strength, being less bitter, and less astringent to the taste: also shewing less Gallic acid, upon the addition of the Martial solution.

Experiment III.

My worthy friend and fellow graduate, Mr. Nelson, having had five slight paroxysms of a Quartan Intermittent, agreed to try, if the bark of the wild Cherry-tree would not stop it—Accordingly, on the 22nd of March, the day after a paroxysm, at 11 o'Clock, the temperature of the room being 55° of Fahrenheit's thermometer, his pulse languid, beating 64 strokes in a

* It is to be understood, that all my decoctions were made, in an earthen vessel commonly called a Pipkin.

† It may be requisite to say, that the solution of green Vitriol, used in my Experiments, was made of three Drachms of the Sulphate of Iron to eight ounces by measure of pure water.

minute, he took two ounces by measure of the decoction made in Experiment I. — His pulse being examined every 5 minutes, for the space of an hour, was found to beat in 5 minutes 64 strokes; in 10 — 70; 15 — 72. The dose is now repeated: in 5 minutes, after taking the last dose, it beat 68 strokes, much increased in force and fulness; in 10 — 72; 15 — 70. The dose is now repeated: in 5—73; 10 — 74; 15 —70, fuller and stronger. The dose is repeated: in 5—72, still active; 10—70; 15—68, fuller than at any prior period; and his face is flushed. In 30 minutes, from the time of taking the last dose, he was very drowsy: upon examination, his pulse was found to beat 64 strokes in the minute; and to be full and strong.—His appetite for dinner, to day, is better than it has been for near two weeks past.

Experiment iv.

By boiling, upon two ounces of the recent bark of a root two inches in diameter, a quart of soft water to a pint, I obtained a very strong decoction; much more bitter and astringent to the taste, than the decoctions made from the bark of the branches.

Upon the addition of a tea spoonful of the solution of green Vitriol, to two ounces, by mea-

sure, of this decoction, a blacker colour was struck than in either of the preceding Experiments.

March 23d. To Mr. Nelson, at 12 o'clock, about six hours before the usual time for the accession of a paroxysm of his Intermittent, the Thermometer in the room standing at 57°, his pulse beating, in a minute, 72 strokes, which are better defined than they were yesterday, before the experiment III commenced, I gave two ounces, by measure, of this decoction. His pulse was examined as before: in 5 minutes it beat 74 ; 10—75, fuller; 15—78. The dose is now repeated. Immediately after swallowing this dose, as he felt his mouth and fauces very much constringed, he moistened the cork, which stopped the vial containing the solution of green Vitriol, with the solution; and applied it to his tongue. That part of his tongue, which came in contact with the cork, was made as black, as if ink had been dropped on it. In 5 minutes, after taking the last dose, his pulse beat 75; 10—76; 15—74, full and strong. The dose is repeated, in 5—72, he is drowsy ; 10—72 ; 15—70, he is still sleepy. In the course of the afternoon, he took six ounces more of this decoction. His pulse being examined, from time to time, was found to continue pretty active.

Experiment v.

I infused half an ounce of recent bark, taken from the trunk of a tree 8 inches in diameter, in half a pint of boiling water. After standing together in a covered vessel remote from the fire, for 12 hours, the fluid was decanted; and was found considerably bitter and astringent to the taste. Upon adding a tea-spoonful of the martial solution to two ounces of this infusion, it instantly assumed a dusky green colour.

March 24th. At 9 o'clock, the temperature of the room being 60°, my obliging friend Mr. Jenks, having breakfasted moderately at 15 minutes past 7 o'clock, his pulse somewhat tense, and more frequent than natural, beating 86 strokes in a minute, took two ounces by measure of this infusion. It is proper to observe that Mr. Jenks, feeling some Pleuritic symptoms, on the evening of the 22d instant, lost twelve ounces of blood, and on the morning of the 23d, took a strong cathartic, which operated very copiously. He felt a little unwell, when he took the first dose of the infusion. His pulse, being examined every 5 minutes, was found to beat in 5—88; 10—89, and increased in force; in 15—96, he feels some headach. The dose is now repeated: in 5 minutes 100 strokes, headach increased,

and his pulse much fuller, 10—100; 15*—99; 20—96; 25—98; 30—98. The dose is now repeated: in 5—100; 10—102, very hard and full, and he complains very much of a headach; in 15—99.

Experiment vi.

I infused half an ounce of the same kind of bark, with that used in the last Experiment, in half a pint of cold water for 18 hours; the fluid, being then decanted, gave out an aromatic odour, extremely grateful to the smell, and communicated to the taste the flavour of the kernels of Cherry-stones, with but little bitterness. It was of a much handsomer colour than either the decoctions or the infusion with boiling water, being of a rich yellow approaching a brown colour. This infusion is nearly transparent, in which it differs from the other preparations, they becoming somewhat turbid upon cooling. Letting fall a tea-spoonful of the solution of Sulphate of Iron into two ounces, by measure, of this infusion, in a short time, its colour was changed to a blackish cast. Judging from the slight bitterness of this infusion, that it must be less active than the decoctions, or the infusion with boiling water, I deemed it unnecessary to make a comparative Experiment on the pulse.

* The dose is not repeated now, in consequence of the high excitement of his Arterial system, and the great uneasiness of his head.

Experiment VII.

Though the woody part of a branch, an inch and a half in diameter, had neither bitterness, nor astringency perceptible to the taste, yet to determine, what impregnation it would give to water, upon the application of heat, I boiled two ounces of it cut into small pieces, in one quart of water to a pint. These afforded an insipid decoction of a reddish cast. But upon pouring a tea spoonful of the Martial solution into two ounces of this decoction, it was instantly turned of a blackish colour.

The ligneous part of the root being also insipid, I judged that it would be useless to submit it to any Experiment.

With a design to try the effects of the bark of the Cherry-tree in substance, upon a human subject enjoying perfect health; and also to ascertain the relative powers of the bark of the root and bark of the trunk, I made the two Experiments following next.

Experiment VIII.

April 2d. at 12 o'clock, the Thermometer in the room standing at 67°, my pulse beating 64 strokes in a minute, I took half a drachm of the powdered bark, taken from the trunk of a tree 8 inches in diameter.

My pulse was examined every five minutes, during the space of an hour, by Mr. Nelson: in 5 minutes it beat 62 strokes; 10—64; 15—67; 20—66; 25—66, pretty active; 30—68. The dose is repeated: in 5 minutes after taking the last dose it beat 68; 10—70; 15—68; 20—69; 25—64, pretty full and strong; 30—64. In 75 minutes, from the commencement of the Experiment, my pulse beat 62 strokes being fuller and stronger than it was, before I took the first dose of the medicine: in 90 minutes 62 strokes.

Experiment IX.

April 3d. at 12 o'clock, temperature of the room being 68°, my pulse beating 64 strokes in a minute, its natural standard, I took half a drachm of the powdered bark, gotten from a root two inches in diameter. My pulse was examined as before; in 5 minutes it beat 64 strokes; 10—60, but increased in force; in 15—68; 20—70; 25—72; 30—72. The dose is repeated: in 5—68; 10—66, full and strong; 15—64; 20—66; 25—66; 30—68, it is very active. In 75 minutes, from the commencement of the experiment, my pulse beat 62, being full and strong—I now felt very drowsy—in 90—60, still full and strong, and the drowsiness continues.

Experiment X.

To determine the comparative antiseptic powers of the bark of the Prunus Virginiana, Peruvian bark, and Gentian, in separate vials, I infused two drachms of each of those articles, reduced to a coarse powder, in four ounces of boiling water for ten hours. Then the different infusions were strained through old linen, into common glass tumblers; after which one drachm of fresh beef was put into each. These infusions with the beef in them, were submitted to a heat of 75°, or 80°, of Fahrenheit's Thermometer, for about six hours out of the twenty four; the other part of the day they were kept in a much lower temperature. On the evening of the eighth day, from the time the beef was put in, some air-bubbles were discoverable on the surface of each infusion. On the tenth day, a very disagreeable sour smell was emitted from all the tumblers; but the smell, according to the best of my perception, from the tumbler containing the remains of the infusion of Gentian, was the most acid: I say remains of the infusion, for the fluid from every glass was now evaporated; in consequence of which, the pieces of beef were thrown away.

Although this experiment did not turn out so decisive, as I could have wished, yet it proves that the bark of the Cherry-tree is considerably

antiseptic, probably, as much so as Peruvian bark, and more so than Gentian.

§. III.

Remarks on the preceding Experiments.

The constriction of the mouth and fauces, which is considered the most unexceptionable criterion of astringency, produced by the aforementioned preparations when tasted; and also the black or blackish colour, which is likewise relied upon as a test of astringency, assumed by portions of these preparations upon the addition of the martial solution, prove that the bark of every part of the tree contains the astringent principle. The sensations imparted to the organs of tasting and smelling by those preparations, sufficiently establish the residence of the bitter and aromatic principles in the bark of the different parts of the tree. Here, then, in the bark of our vegetable, we have combined an astringency, a bitterness, and an aroma; the very same principles, in which the immense powers of the celebrated Peruvian bark are judged to consist. But, perhaps, it may be asked do they exist in the same proportions? I believe they do not, from a comparison of my Experiments with those, that have been made upon the Peruvian bark by many different persons, particularly, those made in my presence, by

my ingenious friend Mr. Nelson*. The bark of the Cherry-tree seems to possess the most astringency and aroma. On this account, it should be preferred in certain instances requiring a medicine more astringent or more aromatic than the Peruvian bark. That there are conditions of the system demanding this additional astringency and aroma, I hope to shew in the sequel; whereas, on the contrary, very few cases occur in which this more abundant astringency and aroma would be prejudicial, when the Peruvian bark could be given with safety and advantage.

That the bark of the Cherry-tree possesses another useful addition, viz: a narcotic quality, I judge, from its producing drowsiness in almost every person who took it.

It appears from my experiments, that our bark, exhibited in different forms, exerts considerable influence on the heart and arteries, increasing their action both in frequency and in force.

From the experiments on myself, the bark of the root seemed more powerful than the bark of the trunk.

* Who is now engaged in writing an Inaugural Dissertation on the Peruvian bark.

I would conclude, from marking the operation of this medicine upon Mr. Nelson, that it was a strong and durable tonic, for we find, that the languor and weakness, which appeared not only in his arterial system, but also in all the other systems, at the commencement of Experiment III, were soon, in a great measure, removed by the use of the decoction; and that at the commencement of the Experiment IV, on tha 23d of March, his general strength was greater, and his pulse fuller and stronger, than when he had recourse to the medicine on the 22d of March.

It may be well to observe, that the portions of the different preparations, to which the solution of Sulphate of Iron was added, after standing in separate vials for ten days, upon examination, were found to have put on a blacker colour; and to have thrown down very small quantities of a precipitate. This proves that our bark contains much gummous matter, which suspended the Gallate of Iron.

§. IV.

CHEMICAL ANALYSIS OF THE BARK.

EXPERIMENT XI.

To an ounce and a half of the dried bark of branches two inches in diameter, broken into

small pieces, were added a pint and a half of pure water in a distilling apparatus. The fire was raised very gently, until about three ounces of liquid were collected in the receiver, and on examination there was no oil to be seen, but the distilled water had a faint taste of the bark and a slightly aromatic smell.

Upon the addition of the Martial solution, no change took place in its colour.

Experiment XII.

I infused one ounce of bark, taken from a root about two inches in diameter, in half a pint of rectified spirit for seven days. Then by evaporating the spirit with a gentle heat, I obtained seventy-eight grains of a brown coloured resin, which was very bitter, and extremely astringent to the taste.

Experiment XIII.

One ounce of the bark, gotten from the trunk of a tree ten inches in diameter, treated with the same quantity of rectified spirit, and in the same way with the bark in the last experiment, yielded one drachm of resin, precisely similar in its external qualities to the resin obtained from the root.

Experiment XIV.

I boiled different portions of water, upon

two ounces of the bark of branches two and three inches in diameter, until the last portion, when cold, was transparent. The liquors, decanted at different times, being now cold were strained ; then by slow evaporation, they afforded one drachm and a half of gummy matter, which was but slightly bitter and astringent to the taste.

Although my experiments, from not being several times repeated, would not warrant us to determine what proportion the resinous bears to the gummous matter, yet they certainly authorise us to conclude, that our bark contains both a gum and a resin in considerable quantities.

Experiment XI seems to prove, that the bark possesses some aromatic particles, which may be driven off by the application of heat.

To compare the effects of the spirituous and watery extracts on the pulse, I gave to Mr. Nelson, in two doses, with an interval of half an hour between them, twenty four grains of the extract made by evaporating the tincture of the bark of the root. His pulse, being examined frequently, during the space of an hour and three quarters, discovered its action to be considerably increased.

The day after, he took the same quantity of

the extract made by evaporating the decoctions; and his pulse, being examined as before, discovered but little increased activity.

It is ascertained, by this trial, that the spirituous acts more powerfully on the arterial system than the aqueous extract.

§. V.

Pharmaceutic treatment of the bark.

Most writers on the Peruvian bark, especially those, who have been engaged in extensive practice, concur in directing, that it should be exhibited in the form of a powder to get its full effects, because, say they, the medicinal parts exist in the most happy proportion in the entire bark. The same argument must apply to the bark of the Prunus Virginiana, therefore, in every instance where the stomach will bear our medicine in substance, that form should be preferred.

But in cases, which do sometimes occur, as the Peruvian bark in substance cannot be retained long enough in the stomach, on account of the great irritability of that viscus, to benefit the suffering patient, we resort to preparations holding the active parts of that medicine in a liquid state: and judging, that like circumstances will direct us to similar forms of our bark,

I made some experiments to determine the relative powers of different menstrua on it.

Experiment XV.

By pouring two ounces of proof spirit, on one drachm of bark, gotten from the trunk of a tree 8 inches in diameter; after suffering them to remain together for seven days, being frequently shaken during that time, I got a very agreeably bitter tincture. In order to ascertain exactly how much of the bark the spirit had dissolved, I filled a vial capable of containing by measure one ounce of a fluid with some of the same spirit, with which the tincture was made; and having weighed it accurately, it was emptied. I then carefully passed the tincture through filtering paper; and having filled the same vial with the filtered tincture, it weighed five grains and upwards more, than when filled with the pure spirit.

In this way, it was determined, that the two ounces of spirit had taken up full ten grains of the bark.

Experiment XVI.

To one drachm of the same kind of bark, and in the same state with the bark used in the last experiment, were added two ounces of rectified spirit of wine; after standing seven days

in a vial, being agitated three times a day, the tincture, which had a very bitter taste and a rich brown colour, was filtered. The vial, which was used in the last experiment, being filled with this tincture, weighed three grains more, than when filled with the pure rectified spirit*.

Experiment XVII.

Upon one drachm of the same kind of bark, and in the same state, with that used in the two preceding experiments, were poured two ounces of cold water; after remaining together for twenty four hours, being agitated three times a day, the infusion was passed through filtering paper. The vial used in the other experiments, being filled with it, weighed four grains more than an equal measure of the same water, from which the infusion was made.

Experiment XVIII.

By boiling over a slow fire, for an hour and a quarter, four ounces of pure water to two ounces, upon one drachm of the same kind of bark, and in the same condition with that used in the preceding experiments, I got a strong decoction, which being poured off and suffered to cool slowly was passed through filtering paper. The

* The martial solution struck a black colour, with both of the last mentioned tinctures.

vial used in the other experiments being now filled with it, weighed four grains and a half more, than the same measure of the water from which the decoction was made.

Experiment XIX.

After the tincture of experiment XVI was decanted, to the residuum I added two ounces of pure water; after remaining together for twenty four hours, being frequently shaken, the fluid was passed through filtering paper. The vial so often mentioned, being filled with it, weighed nearly four grains more than when full of the water, from which the infusion was made.

We may conclude that proof spirit is the best of those menstrua, which I tried, not merely, because it dissolves more of the bark, but also, being calculated from its component parts to take up both gum and resin. Of course, a tincture with proof spirit approaches, with respect to medical virtues, nearer the entire bark, than any other liquid preparation. Wherefore, unless its use is forbid by an inflammatory state of the system, it must be the best preparation, when on account of great weakness and irritability of the stomach, the bark in substance cannot be retained long enough to exert its salutary influence.

As it appears from my experiments that the decoction, after the deposition of the resinous matter which was melted out by the heat, holds very little more of the bark in solution than the infusion; and as the infusion receives a lighter, more agreeable, and purer impregnation, it should be preferred to the decoction in those cases, wherein the bark in substance cannot be kept in the stomach; and the use of the spirituous extract is prohibited by the condition of the system.

§. VI.

Of the use of the bark in medicine.

In Phthisis Pulmonalis

Were not the symptoms marking the forming state of this disease, or rather the general debility, which predisposes to it, too seldom observed; or when observed, were they not so often treated with equal neglect by Patients and Physicians; it might be arrested in its progress, by a proper application of remedies, with as much certainty as an intermitting fever, by medicines adapted to its cure. In this state of the system, tonics, such as the Peruvian bark, for which our bark might be substituted, are highly recommended; and their efficacy has been sanctioned by experience. But when from neglect or ignorance, the unfortunate sufferer is reduced to that

deplorable condition, constituting what is commonly called the last stage of this disease; but with more propriety called by Professor Rush the *Typhus state of Consumption.* Then is the bark of the Cherry-tree superior to any other tonic, yet discovered, as has been conspicuously proven in many instances. What gives it this superiority? Is it more astringency, than the Peruvian bark possesses, together with an anodyne quality?

Professor Rush has politely informed me, that in many cases of the Typhus state of Consumption, he has used a decoction of the bark of the Prunus Virginiana with manifest advantage; but he well recollects, that in one instance, he effected a perfect cure with it. The gentleman lived 20 years after, though with a weak breast.

Our medicine has been lately used in the Pennsylvania Hospital with evident advantage. I will insert the history of the case, as it was handed me, by my obliging friend Mr. Hutchinson the senior student in the Hospital.

Mr. Hutchinson says "Grace Davidson, aged 20 or thereabouts, having a Fistula in Ano, was admitted into the Pennsylvania Hospital about 13 months ago, when she came in, her health in general was pretty good, and continued

to be so until the latter end of February last, when she complained of pains in her breast, and became considerably emaciated. After these symptoms had continued for a few days, a Diarrhœa came on, for which she used the Cretaceous Julep and Tr Kino, but without being in any manner relieved by them; after these she took a decoction of Cinnamon and Galls, but with no more advantage than the other medicines. She grew worse every day, she sweated constantly, her pulse was weak and frequent, she coughed frequently and expectorated a considerable quantity of mucus, and her Diarrhœa became more alarming. On the 9th of March she began to take lbs. II of a decoction of the Prun: Virgin: every day, after using it for a few days, she was in every respect better. It was omitted on the 2d of April, on account of a sickness at her stomach. On the 10th she resumed the decoction, and used it with great advantage. On the 23d the dose was increasedto lbs. III a day, she is now able to walk about, the Diarrhœa has left her, and the discharge from her lungs is very much diminished. She continues using the decoction."

In the intermitting state of fever.

When tonics are indicated in this fever, from the constituent parts of our bark, which I flatter myself are now pretty well ascertained, we may

conclude that it might be given with as much success, as the Peruvian bark in the state in which we commonly use that medicine. This conclusion is supported by many trials, particularly, in the case of Mr. Nelson, who had his disagreeable companion effectually driven off by our medicine, used in the manner mentioned, Experiments III and IV.

Dr. Young says, that when Skeensborough (New-York) was first settled, the inhabitants were much affected with intermittents. Conceiving that many of them, being new settlers, could not afford to purchase medicine, he advised them to use an infusion of the wild Cherry-tree bark; and he was afterwards told, that it proved as efficacious as the Peruvian bark*.

In Dysentery.

However improper it may be to exhibit tonics in Dysenteries attended with much fever and inflammation, yet upon the authority of Cleghorn and Saunders† in that form of Dysentery, which towards the latter end of summer or beginning of autumn assumes the type of an intermittent, we can strongly recommend, after the requisite evacuations, tonics to be given during the intermission. Admitting, as we must, the utility of tonics in Dysenteries of this kind,

* A new Physical System of Astronomy. To which is annexed a Physiological treatise. Also, successful methods of curing Cancerous ulcers. the Quartan ague, &c.

† Cleghorn's Minorca. Saunders's treatise on the red bark.

unquestionably the Cherry-tree bark from the properties, which it seems to possess, would prove a more safe, more agreeable, and more effectual medicine than any we could elect, from among the articles in the Materia Medica under the head of Tonics. The qualities which, with the usual tonic power, give it this preference are:—1st. An anodyne property, which would ensure it to set more easy on the stomach; and certainly this should be an important consideration with us, when we are about to select a medicine for the relief of delicate and irritable habits. For frequently, in this disease, we meet with considerable embarrassment, from not being able to keep the Peruvian bark (which is the tonic generally used) long enough in the stomach to benefit the suffering patient. This narcotic quality would also be the means of easing the troublesome gripes, generally attendant upon this disease.

2d, A quantity of gummy matter, especially in the cold infusion, which will sheath the internal surface of the intestines, and allay irritation by obtunding the acrimony of the alvine contents.

In Dysenteries of long standing, which are unaccompanied with much fever or an inflammatory state of the stomach and bowels; and are

about to put on the nature of a Diarrhœa, our bark, not only from its peculiar qualities just mentioned, but also from its great astringency, bids fair to be an efficacious remedy.

In Diarrhœa.

It is evident, admitting this form of disease to consist in an increased evacuation from the exhalents and excretories on the internal surface of the intestines, that the bark of the Prunus Virginiana will be efficacious, when its use is not forbid by the presence of an inflammatory diathesis. Its efficacy in this disease is evinced by the following case, communicated to me by my obliging friend Mr. Shaw the senior student at the Alms-house of this City, who gave our medicine a trial in compliance with my particular request.

Mr. Shaw says, "On the 30th of March 1802, I. A. aged 33 was admitted into the Alms-house for a Diarrhœa of long standing, by which he is much emaciated; and his feet are affected with œdematous swellings.

31st. There being no marks of an inflammatory diathesis in his system, he was ordered fifteen grains of the powdered bark, gotten from the trunk of the Prunus Virginiana, to be taken three times a day.

April 1st. Diarrhœa nearly as it was yesterday, medicine increased to one scruple three times a day.

2d. Diarrhœa somewhat abated, medicine continued.

3d. He continues better, medicine increased to the dose of half a drachm three times a day.

4th. He is much better to day, having rested pretty well last night, appetite increased.

5th. He rested well last night; Diarrhœa is well; swelling of his feet is gone; and his appetite is restored.

6th. He continues well."

In abscesses attended with Hectic fever, and colliquative sweats.

We might have ventured a supposition, from the analogy of the qualities of the Cherry-tree bark to those of certain other medicines, that it would be useful in affections of this kind. But this is confirmed by a case, communicated to the Editors of the *Medical Repository* of New-York by *Dr. Cutbush.** The history of which, as it is illustrative of the powers of our bark, I beg leave to insert in a condensed state†.

A Seaman on board the frigate United States, being much reduced by a *Lumbar Abscess* attended now, with Hectic fever, profuse

* Medical Repository. Vol. V. No III.

† I shall say nothing of the local treatment of the abscess.

sweats, troublesome cough discharging much puriform matter from his lungs, was ordered Infus: Cort: Peruv: cum, Serp: Virg: and Elix: Vitriol: to be taken frequently; half a pint of wine per day, and a light nourishing diet.

This mode of treatment was continued for two days, with no apparent benefit. Then the Infus: Cort: Peruv: &c. in consequence of not setting easy on his stomach were omitted, and he was ordered a strong decoction of the bark of the wild Cherry-tree, the Elix: Vitriol:, wine and nourishing diet to be continued.

Almost immediately upon using the decoction of the bark of the Prunus Virginiana, the discharge from the abscess was diminished, his sweats became less profuse, his appetite increased, and his pulse not so frequent. Every unfavorable symptom was so much abated by our medicine, that he continued its use until a cure was perfected.

Thirty-eight days from the time he began to use the decoction of the bark of the Prunus Virginiana, he appeared to be in a very good state of health; and solicited to remain on shore, which was granted him.

More than seven months after this time, Dr. Cutbush met with him, in Philadelphia in very

good health, having experienced no inconvenience from the disease.

It appears from this case, that the bark of the Prunus Virginiana will set easy on the stomach; and do every thing we could wish, when the Peruvian bark disagrees with that viscus.

In vitiated ulcers.

For the production of good purulent matter, and for an ulcer to be disposed to heal, a certain degree of tone over the whole body; also in the part is requisite. When there is too much action this should be subdued by depletion. But when an ill-conditioned discharge depends upon too little action, this may be increased by tonics given internally, and certain local applications such as escharotics, decoctions of wild Cherry-tree bark or Peruvian bark. Though, in most cases, escharotics should be preferred, yet I believe the tonic and antiseptic washes, just mentioned, sometimes do great good. An instance in point is related by *Dr. Young* of *New-York.** As it tends to shew the virtue of our bark; and as his book is not very generally known, I think it incumbent on me to give a summary history of the case.

A MAN having his leg ulcerated to the bone almost from his knee to his ankle, after it

* A new Physical system etc.

was given up and deemed incurable by the *Surgeons* of New-York, returned to Long-Island, where he lived, resolved to submit to his fate. A few days after his arrival there, he met with an Indian squaw, who said she could cure his leg; and he agreed to let her try her skill. She then got a large quantity of the wild Cherry-tree bark; some of which she spread out to dry; and made strong infusions of the fresh bark in boiling water, which she injected into the numerous ulcerations by means of a syringe, which he had brought with him. After cleansing the ulcers in this way, she powdered the dry bark, with which she filled the holes that reached to the bones; they were then covered over with pledgets and compresses dipped in the infusion of the bark. These dressings were renewed every twenty four hours. In a few days, the patient felt so much relief from this mode of treatment as encouraged him to persevere, and in about two months he was able to walk about. When Dr. Young saw him, some months after, he had travelled several miles on foot.

It is useless to dwell on the many other forms of disease, in the treatment of which the bark of the Prunus Virginiana may be substituted for the Peruvian bark. Suffice it to say, that their component parts are so nearly alike,

that where the latter, so likewise is the former indicated.

§. VII.

Experiments on the leaves.

I. By submitting to a moderate degree of heat, half a pound of the leaves* of the Virginian Cherry-tree with a pound and a half of pure water in a tin still, for 16 hours, I obtained ten ounces of distilled water, which I shall call water of the first distillation.

II. I then poured four ounces of this distilled water, upon a fresh portion of leaves weighing two ounces; and by distilling, in the same apparatus, with a very gentle heat for 12 hours, I got two ounces of a fluid from the receiver, which I shall call water of the second distillation.

III. To a kitten five weeks old, I gave forty drops of the water of the first distillation. Immediately after swallowing it, the animal was vertiginous; and in five minutes was convulsed all over; in twenty minutes, the kitten appeared somewhat recovered, except about its loins and hind legs, which were completely paralysed. The same quantity as before was now given, which threw it into an apoplectic state, in which condition it continued for an hour, and then died.

* The leaves were by no means fully expanded, being gathered about the 24th of April.

IV. To a dog I gave one ounce of the water of the first distillation: he was instantly made very sick and vomited two or three times, after which he gradually recovered.

V. To a pigeon fully fledged I gave a tea-spoonful of the water of the second distillation: instantly, after swallowing it, the animal fell upon its breast writhing itself in various directions. It continued unable to walk for twenty minutes, then it walked a little. In thirty minutes it was very much recovered: I then gave it twelve drops more, which momentally threw it into convulsions, in which it expired in two minutes.

VI. To another pigeon of the same age I gave a tea-spoonful of the water of the first distillation, which produced symptoms similar to those, which appeared in the first pigeon. In thirty minutes, it having recovered considerably, the same quantity was repeated, but not affecting it very violently, half a tea-spoonful more was given, which brought on convulsions and death in three minutes.

VII. To a small dog I gave two ounces of the fluid remaining in the still, after the first distillation: it had no observable effect on him.

VIII. To a dog, I gave, in the course of an hour and a half, several doses of a saturated decoction amounting in the whole to eight ounces, with no other effect than disordering him slightly.

IX. To a dog, I gave one ounce of the water of the second distillation : it soon made him very sick, and in ten minutes he vomited ; in fifteen minutes (as the water of the second distillation was nearly out), I gave him two ounces of the water of the first distillation, which made him extremely sick, though he survived.

We may infer from our experiments, that the leaves of the Prunus Virginiana, treated in the same way with the leaves of the Prunus Lauro-Cerasus of Europe (as I was induced to suspect from their botanical alliance, and also from the circumstance of the leaves of the Virginian Prune being "poisonous to certain animals, as calves"*) will afford a product equally as poisonous : for we found, that though a considerable quantity of water was distilled from leaves, which were not fully grown, yet it proved very active. Whereas, Fontana says "on distilling a great deal of water, from a few of the leaves of the Cherry-Laurel, I found it quite innocent."†

* Dr. Barton's collections, etc.

† Fontana on poisons.

It seems that the deleterious principle of the leaves is very volatile, because the residuum of the first distillation, and the saturated decoction in a large quantity, produced no ill-effects on dogs.

F I N I S.